

REMARKS

Claims 28-54 are pending in the present application. Applicant has amended claims 28 and 42 to clarify the distinction between the invention and cited prior art. Applicant has amended claims 34 and 47 to depend properly from claims 28 and 42, respectively. Support for these amendments may be found in the specification in paragraphs [0037] and [0041], and in Figures 8-13. No new matter has been added to the amended claims. Applicant requests the cancellation of claims 30 and 43 in view of the scope of amended claim 28 and 42, respectively. Reconsideration of the claims is respectfully requested.

CLAIM REJECTIONS

35 U.S.C. 103 rejection

The Examiner has rejected claims 28 - 54 under 35 U.S.C. 103(a) for purported obviousness over U.S. Patent No. 4,949,778 to Saito et al. ("Saito et al.") and European Patent Publication No. EP0852166 (the '166 publication). The Examiner asserts that each of Saito et al. and EP '166 teach multi outlet casting nozzles equipped with a plurality of pairs of outlets above the terminal closed end of a nozzle showing all aspects of the pending claims except the outlet dimensions or shapes. The Examiner also asserts that Saito et al. and EP '166 allow for the shapes and dimensions recited in the present claims in their broadest encompassed embodiments. In response, claim 28 of the present application has been amended to recite a total outlet area that is less than twice the cross-sectional area of the central bore. Support for this recitation is found in paragraph [0041] of the specification. This recitation distinguishes the claimed invention from the teachings of Saito et al., which call for a total area of all outlets that is not less than twice the sectional area of the molten steel passage (corresponding to the central bore of the present invention). Claim 28 has also been amended to recite discharge outlets that are directed at an angle not greater than 90 degrees with respect to the longitudinal axis of the nozzle, measuring from the end directed towards the closed end of the bore. Support for this recitation is found in paragraph [0037] of the specification and in Figures 8-13, all of which show embodiments of the invention in which each direction of flow from a discharge outlet describes an angle with the downward portion of the longitudinal axis of the nozzle that is not greater than 90 degrees. This recitation distinguishes the claimed invention from the teachings of EP '166, in which each outlet of the at least two first outlets has a prevalently upward direction, and in which each outlet of the at least two second outlets has a prevalently downward direction.

The Examiner also asserts that it would have been obvious to one of ordinary skill in the art to modify the outlets of both of Saito et al. and EP '166 to produce the outlets of the preset invention. However, as is noted in the Affidavit filed herewith, certain improved results are imparted by the outlet disposition and outlet shapes of the present invention. These improved results include a reduction in turbulence, as is shown by the flow modeling results referred to in the Affidavit.

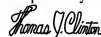
For these reasons, the rejection of claims 28-54 under 35 U.S.C. 103 (a) is believed to have been overcome.

Applicant respectfully submits that claims 28-29, 31-42 and 44-54, as amended, are patentable over the prior art. Early and favorable action is earnestly solicited.

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